

DOCUMENT RESUME

ED 078 196

VT 020 392

TITLE Information on the Metric System and Related Fields.

INSTITUTION National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.

PUB DATE 1 Nov 72

NOTE 34p.; Fourth Edition

EDRS PRICE MF-\$0.65 HC-\$3.29

DESCRIPTORS Audiovisual Aids; Books; Information Dissemination; *Information Sources; *Instructional Aids; *Metric System; Military Organizations; *Resource Guides; Resources

IDENTIFIERS Marshall Space Flight Center

ABSTRACT

Contained in this guide are announcements of references and audio-visual courses on the metric system and related fields available at the Marshall Space Flight Center. Included by sectional entries are listings of: (1) books, (2) reports, papers and articles, (3) periodicals, (4) film strips, (5) posters, (6) education and training courses, (7) materials produced by the International Organization for Standardization, (8) materials produced by the International Electrotechnical Commission, (9) conversion tools, (10) addresses of sources from which other information can be obtained, and (11) sources from which metric tools, instruments and components can be obtained. (SN)

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The attached handout, fourth edition, containing pertinent information on the metric system and related fields available at the Marshall Space Flight Center, is forwarded for your use and retention. It may serve you as a quick reference to metric information which is still scarce and scattered.

Though compiled with care, no responsibility for possible errors or omissions are assumed.

This handout will be updated from time to time; your comments/suggestions and reference to not-yet-listed metric information, you may be aware of, will be appreciated.

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Information On The Metric System & Related Fields

Fourth Edition

Nov. 1, 1972

Call No.*

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NBS-SP-345- 1:	International Standards	X0910 5
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- * Complete sets of these reports are available in Huntsville, AL, from:
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83. National Metrication is Now in Sight; Louis F. Sokol, President, Metric Association, Presented at ASME, 26 February 1971.
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107. Think Metric, a leaflet for architects, engineers, surveyors and builders. Guidelines for learning and appreciating metric units of measurements. (British) Ministry of Public Building & Works, 1969, 8 pages, HMSO.
108. Understanding Units of Force; B. Swindells, (British) National Physical Laboratory, Newgate Press Ltd., 18-20 Laystall Street, London EC1, England.
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111. U.S. Plants Can Take Lessons From Britons on Metric Conversion, Modern Manufacturing, Oct. 1969, 2:108-110.
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119. We can't lick 'em; so we better go metric soon; Hall, F. Machinery, v. 76, December 1970: 36-9; v. 77, February 1971: 45-8.
120. What's all this about Metrication? MacDonald, B. I., Chemical Engineering Progress, v. 66, May 1970: 345.
121. What to do when Metric comes: (or, some engineering guidelines for converting your firm or office to the metric system), George C. Lovell, P. E., Professional Engineer, December 1970.
122. When 34-24-34 becomes 86-61-86, Kroeze, H., Industrial Engineering, February 1972, 4 (2): 10-15.
123. Why We Must "Go Metric", Dr. Lewis M. Branscomb, Commerce (Chicago Chamber of Commerce), June 72, :19-21, 58.
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C. PERIODICALS

available at the Redstone Scientific Information Center.

1. British Standards Institution News, London, England; monthly.
2. Canadian Standards Association, Rexdale, Ontario, Canada; quarterly.
3. Going Metric, (British) Metrication Board, London, England; quarterly.
4. Magazine of Standards, American Standards Institute, New York, NY; monthly.
5. Metric Association Newsletter, Metric Association, Inc., Sugar Loaf Road, Salina Star Route, Boulder, CO 80302; quarterly.
6. Metric Information Service, Rovipress, Ltd., 8-10 Parkway, London NW1, England (on order).
7. Metrication News, Rovipress, Ltd., 8-10 Parkway, London NW1, England, (on order) bimonthly, LC: No. QC 91.038.
8. Metrication Newsletter, GKN Group Metrication Officer, Birmingham, England, Start: Feb. 1971, published at random intervals.
9. Standardisation, Directorate of Standardisation, Ministry of Defence, London, England.
10. Standardization, News Magazine of the American Standards Association, Inc., New York, NY; monthly.
11. Standards/Canada Newsletter of the Canadian-Standards Association, Rexdale, Ontario, Canada, published every two months.

D. METRIC LEGISLATION

The "Metric Conversion Act of 1972", originally introduced to Congress as Senate Bill S 2483 by Senator Claiborne Pell (D-RI) on 6 August 1971, and later modified, calls for the creation of a 11 member National Metric Conversion Board, drawn from industry, trade and labor associations and citizen groups, to plan and coordinate a voluntary ten-year change-over to predominantly metric units, an approach similar to the current British program. It also states that "costs will lie where they fall".

This bill has been approved unanimously by the Senate on 13 August 1972 and is now awaiting action in the House of Representatives.

E. FILM (16 mm)

1. Discover Why Metric, 14 minutes, color, Regal-Beloit, Box 58, South Beloit, IL 61080 (on order).
2. Design, 15 minutes, British Information Office, 845 Third Ave. New York, NY 10022.
3. Going Metric, Central Film Library, London, England,* sound, black and white, 29 minutes, GB 1968; also: Time-Life Films, Inc., 43 West, 16th Street, New York, NY 10011. Study of a British factory in conversion with costs of metric drawings, best conversion time period, need for metric drills, taps, and tools, converting lathes, dialing and digital read-out, and training apprentices. For adults already conversant in shop practices.
4. Industrial Design, 10 minutes, British Information Office, 845 Third Ave., New York, NY 10022. (on order).
5. Industry Goes Metric, Central Film Library, England*, sound, color, 50 minutes. This film shows the advantages of metric measures and why they are being adopted by industry. Aimed at middle management, the film will be of interest also to engineers, technicians, machine operators and young people. - Managers from industrial companies discuss their reasons for going metric and how they go about it. Reference is made to opportunities for rationalization of designs and products, stocks and procedures. Lord Ritchie-Calder, Chairman of the British Metrication Board, outlines the functions of the Board. The roles of the industry and the British Standards Institution are described.
6. International System of Units, 22 minutes, color, Ling Screen Productions, 320 Aurora Ave. North Seattle, WA 98109.
7. Its Later Than You Think, World Wide Pictures, Ltd., 34 Cursitor Street, London EC4, England, sound, color, 6 minutes, GB No. 1968.
8. Key to Metrication No.1: Planning Metrication, Central Film Library, England,* sound, color, 17 minutes. (UK No. 1994).
The Key to Metrication series of three films is mainly for the education of management and supervisory staff in industry. It is aimed at line management in the manufacturing industries. Case histories are used to show how any firm, large or small, can go metric with the minimum disturbance and maximum benefit.**
9. Key to Metrication No.2: Phasing-in Metric Design, Central Film Library, England,* sound, color, 15 minutes. (UK No. 1995).
Film shows metrication as it affects designers and draftsmen. Through examples, the film shows the gradual process of changing designs to metric. The interface technique, design modification and the timing of completely new metric designs are illustrated.**
10. Key to Metrication No.3: Metric Production and Inspection, Central Film Library, England,* sound, color, 14 minutes. (UK No. 1996).
Film identifies the important stages of the changeover to metric production within a firm. Emphasis is given to the value of introducing dual-dialing. It deals also with timing the replacement of tools and measuring devices, and discusses familiarization techniques.**

* See "Addresses for Information".

** Script available on a loan basis.

11. Metric America, A -, A Decision Whose Time Has Come, National Bureau of Standards, sound, color, 35 minutes. Nov. 1971.
This film is a summary of the U. S. Metric Study presentation to the House of Representatives' Committee on Science and Astronautics on 14 September 1971 by Dr. Lewis M. Branscomb, Director of the National Bureau of Standards, and Dr. Daniel V. DeSimone, Head of the Metric Study Team at NBS. The film opens with the Secretary of Commerce making the first public announcement on 29 July 1971 of his recommendations to Congress for a metric program. The film includes graphic material and live props which illustrate some of the main points of the metric study report (Reference publication, same title, NBS SP 345).
12. Metric System, The -, McGraw-Hill Films, Test-Film Division, No. 682832, 13 minutes, color; (Junior High School Level).
13. Metrication, Management on -, two films, sound, color, 25 minutes each, British Broadcasting Corp., Villiers House, The Broadway, Ealing, London W5 2PA, England, (8-page outline available), (on order).
Films are designed for an audience of top management and metrication officers in all fields of industry where the changeover has already begun, or where the effects of metrication will be felt in the future, each of the two films deals with one basic aspect of metrication.
The first film, entitled "The Task for Management" places metrication in its current context, outlining government policy, the roles in the changeover of the British Metrication Board, the Confederation of British Industry, training boards and trade associations. Guidance on identification of the tasks to be carried out in completing the change in a company is given, including advice on the appointment of a metrication officer.
"Management of the Changeover" is the subject of the second film, which deals with the method of assembling the tasks already identified into a coordinated plan, in order to minimize costs and maximize benefits. The need for correct timing of the changeover and the implementation and monitoring of the program once established is emphasized.
14. Q. A., 14 minutes, British Information Office, 845 Third Ave. New York, NY, (on order).
15. Talking Metric, Central Film Library, England* sound, black and white, 30 minutes, GB No. 1908; also: Time-Life Films, Inc., 43 West, 16th Street, New York, NY 10011.
Panel discussion throughout by Britain's specialists metrology, government, industry, education and commerce discussing 1969 plans, progress and advantages of conversion. Mainly for motivated adults and metrication coordinators.

For additional information on the above listed films call:

Dr. William A. Mrazek or Mr. Harry L. Atkins
Metrication Task Group
George C. Marshall Space Flight Center
Marshall Space Flight Center, AL 35812
PD-DIR
Tel.: (205) 453-2155.

* "Addresses for Information"

F. FILMSTRIPS (35 mm) (All Junior High School Level)

1. Metric System, Film Strip-of-the Month Club, No. 1236, Elementary Mathematics, 1967, 40 frames.
2. Metric System, The -, McGraw-Hill Book Co., No. 643015, General Mathematics Series, 1961, 44 frames.
3. Metric System, The -, Eye Gate House, Inc., 146-01 Archer Ave. Jamaica, NY 11435, No. 5-1-3, Mathematics in Action, 1968, 44 frames.
4. Metric System, The -, 6 color film strip with 6 records and manual. Pantages Educational Films, Inc., 71 Weyman Ave. New Rochelle, NY 10802.
5. Metric System of Measuring, The -, Encyclopedia Britannica, Films, Inc., No. 11121 C-S1 Measuring. 1966, 52 frames.
6. Metric Weights & Measures, Library Filmstrip Center, 3033 Aloma, Wichita, Kansas 67211, 1969, 59 frames, color, with phonotape in cassette. Call No. 78-732812.
7. Units of Measurements, Jam Handy Organization, 1944, University of Alabama, Huntsville, AL, Code: 12, No. 2.
8. Using the Metric System, F-O-L Film Strips, Popular Science Publishing Co., No. 185, 1967, 43 frames.

G. METRIC EXHIBITS

1. National Bureau of Standards "Metric Information Center".
About 3 m display front (photos on request).
2. A metric exhibit exists at the Marshall Space Flight Center, consisting of two units, each measuring 1.5 m wide and deep, 2 m high and weighing 300 kg. Each unit can be unfolded at the exhibition place resulting in 4 modules hinged together at the diagonal corners. One module has a slide projector with rotary drum for continuous showing. Slides are included. It works in conjunction with a tape recorder. Tapes are furnished. This exhibit is available on a loan basis at no cost except return transportation. Photos on request.

Handouts: More than 50 types of handouts, small posters for blackboards, pocket cards are available, samples are compiled in three loose-leaf folders: "Metric Material", Vol. I, II and III.

For additional information call:

Dr. William A. Mrazek or Mr. Harry L. Atkins
Metrication Task Group
George C. Marshall Space Flight Center
Marshall Space Flight Center, AL 35812
PD-DIR
Tel.: (205) 453-2155.

H. METRICATION POSTERS

1. "Think Metric" posters, set of 6, National Microfilm Association, Suite 1101, 8728 Colesville Road, Silver Spring, MD 20910.
2. (British) Construction Industry Training Board:*
 No. 1: Miss Metric No. 4: Four Temperatures No. 7: Down a Litre
 No. 2: The Foot No. 5: Super No. 8: The Weigh-In.
 No. 3: The Stamp No. 6: Keep a Cool Head
3. Metrication Board, 22 Kingsway, London WC2, England.
4. Pictorial Charts Educational Trust, 132 Uxbridge Road, London W13, England.

I. EDUCATION AND TRAINING COURSES

1. Center for Metric Education: Western Michigan University, Kalamazoo, MI, Directors: Dr. John L. Feirer, Head of the Department of Industrial Education, and Dr. John R. Lindbeck, Professor of Industrial Education.
2. University of Southern Mississippi, Department of Science Education, Project for Metric Research, Hattiesburg, MS 39401, Director: Prof. John H. Flowers.
3. George Washington University, DC.
4. Colorado State, College of Education, Greeley, CO.
5. Thomas Nelson Community College, Hampton, VA, Courses on the use of the International System of Units (ISU).
6. University of Kentucky, Mechanical Engineering Department, Lexington, KY 40506, Prof. Dr. Uri Gat.
7. Metric Orientation for U. S. Management Industry, video tape, 60 min., Society of Manufacturing Engineers, 20501 Ford Road, Dearborn, MI 48128, Tel.: (313) 271-1500.
8. Metric in the Office, C/1 (2nd Edition, Aug. 1969), (British) Construction Industry Training Board.*
9. South African Bureau of Standards:*
 M 3: Metric sizes for basic materials
 M 13: Recommended practice for building drawings
 M 19: Metrication for the family
 M 25: Metrication for the farmer
 M 27: The use of SI in primary education
 M 28: Metrication for the typist.
10. Check for self-learning textbooks.
11. "GO METRIC" dice game from Zambia. The Zambia Metrication Board, Box 1968, Lusaka, Zambia.

* See "Addresses for Information".

J. INTERNATIONAL STANDARDS

I. International Organization for Standardization (ISO)

1. R 1 -1954 Standard Reference Temperature for Industrial Length Measurements.
2. R 31-I -1965 Basic Quantities and Units of the SI.
3. R 68 -1969 General Purpose Screw Threads, Basic Profile.
4. R 128 -1959 Engineering Drawing, Principles of Presentation.
5. R 129 -1959 Engineering Drawing, Dimensioning.
6. R 225 -1961 Bolts, Screws and Studs, Dimensioning.
7. R 261 -1969 General Purpose Metric Screw Threads, General Plan.
8. R 262 -1969 General Purpose Metric Screw Threads, Selected Sizes for Screws, Bolts and Nuts.
9. R 272 -1968 Hexagon Bolts and Nuts: Width Across Flats, Heights of Heads, Thickness of Nuts; Metric Series.
10. R 273-I -1962 Clearance Holes for Metric Bolts.
11. R 273-II -1968 Clearance Holes for Metric Bolts 42 up to and including 150 mm Thread Diameter.
12. R 286-I -1962 System of Limits and Fits, Part I: General, Tolerances and Deviations.
13. R 288 -1963 Slotted and Castle Nuts with Metric Thread.
14. R 288-II -1969 Slotted and Castle Nuts with Metric Thread; 42 up to and including 100 mm Thread Diameter.
15. R 370 -1964 Conversion of Toleranced Dimensions from Inches into Millimeters and Vice Versa.
16. R 388 -1964 Metric Series for Basic Thicknesses of Sheet and Diameters of Wire.
17. R 463 -1965 Dial Gauges Reading in 0.01 mm, 0.001 in. and 0.0001 in.
18. R 623 -1967 Paper and Board, Sizes of Folders and Files.
19. R 701 -1968 International Gear Notation: Symbols for Geometrical Data.
20. R 724 -1968 ISO General Purpose Metric Screw Threads: Basic Dimensions.
21. R 725 -1968 ISO Inch Screw Threads: Basic Dimensions.
22. R 733 -1968 Hexagon Bolts and Nuts Metric Series: Tolerances on Width Across Flats, Widths Across Corners.
23. R 861 -1968 Hexagon Socket Head Cap Screws, Metric Series.
24. R 885 -1968 Bolts and Screws, Radii Under the Head for General Purpose Bolts and Screws.
25. R 887 -1968 Washers for Hexagon Bolts and Nuts, Metric Series.
26. R 888 -1968 Nominal Lengths for Bolts, Screws and Studs, Thread Length for General Purpose Bolts.
27. R 898-I -1968 Mechanical Properties of Fasteners, Part I: Bolts, Screws and Studs.

28. R 898-II -1969 Mechanical Properties of Fasteners Nuts with Specified Proof Load Values.
29. R 898-III-1969 Mechanical Properties of Fasteners, Marking of Bolts, Screws, Studs, and Nuts.
30. R 965-I -1969 ISO General Purpose Metric Screw Threads Tolerances Principles and Basic Data.
31. R 965-II -1969 ISO General Purpose Metric Screw Threads, Tolerances, Limits of Sizes for Commercial Bolt and Nut Threads, Medium Quality.
32. R 965-III-1969 ISO General Purpose Metric Screw Threads Tolerances Deviations for Constructional Thread.
33. R 1000 -1969 Rules for the Use of Units of the International System of Units and a Selection of the Decimal Multiples and Sub-Multiples of the SI Units.
34. R 1119 -1969 Series of Conical Tapers and Taper Angles.
35. R 1122 -1969 Glossary of Gears, Geometrical Definitions.
36. R 1207 -1970 Slotted Cheese (Fillister) Head Screws.
37. R 1478 -1970 Tapping Screw Thread.
38. R 1479 -1970 Hexagon Head Tapping Screws, Metric Series.
39. R 1481 -1970 Slotted Pan Head Tapping Screws.
40. R 1482 -1970 Slotted Countersunk (flat) Head Tapping Screws.
41. R 1483 -1970 Slotted Raised Countersunk (oval) Head Tapping Screws.
42. R 1580 -1970 Slotted Pan Head Screws, Metric Series.
43. R 1661 -1971 Technical Drawings - Tolerances of Form and of Position - Part IV: Practical Examples of Indications on Drawings.
44. R 1829 -1970 Selection of Tolerance Zone for General Purposes.
45. R 1938 -1971 ISO System of Limits and Fits - Part II: Inspection of Plain Workpieces.
46. R 2091 -1971 Hydraulic Cylinders - Internal Diameters and Piston Rod Diameters - Metric Series.

II. International Electrotechnical Commission (IEC)

1. 68-1&2 (1968- Basic Environmental Testing Procedures for Electronic
1971) Components and Electronic Equipment, Part 1 and 2.
2. 97 (1970) Grid System for Printed Circuits.
3. 103A (1970) Supplement to Publication 103, Aluminum Elec-
trolytic Capacitors for Long Life (Type 1) and for
General Purpose Application (Type 2).
4. 115-3 (1971) Fixed Resistors, Part 3: Wirewound Resistors, Type 1,
Selection of Methods of Test and General Requirements.
5. 117-3A (1970) Supplement A to Publication 117-3 (1963). Recommended
Graphical Symbols, Part 3: Contacts, Switchgear, Mecha-
nical Controls, Starters and Elements of Electro- Mecha-
nical Relays.
6. 130-1 (1962) Connectors for Frequencies below 3 MHz, Part I:
General Requirements and Measuring Methods.
7. 147-3 (1970) Essential Ratings and Characteristics of Semiconductor
Devices and General Principles of Measuring Methods.
Part 3: Reference Methods of Measurements.
8. 249-1A (1970) First Supplement to Publication 249-1 (1968) Metal-clad
base materials for printed circuits. Part 1: Test Methods.
9. 255-2 (1969) Electrical Relays, Part 2: Specified - time all-or-nothing
relays.
10. 309 (1969) Plugs, socket-outlets and couplers for industrial purposes.
11. 319 (1970) Presentation of reliability data on electronic components
(or parts).
12. 321 (1970) Guidance for the design and use of components intended
for mounting on boards with printed wiring and printed
circuits.
13. 324 (1970) Ceramic dielectric capacitors, Type 3.
14. 326 (1970) General Requirements and Measuring Methods for Printed
Wiring Boards.
15. 352 (1971) Solderless Wrapped Connections, General Requirements,
Test Methods and Practical Guidance.

K. CONVERSION TOOLS

1. A variety of short general purpose conversion charts covering many fields too numerous to list here are available.
2. English-Metric Instant Conversion (Tables), E. Joe Penn, 1969.
3. Computerized conversion tables of customary units to metric units and vice versa. All tables range from 0 to 1.050 units in increments of 0.001 units. Converted values are printed to five places or more:

<u>LENGTH</u>		<u>MASS</u>		<u>ANGLE</u>	
in	- cm	oz(Avoir)	- kg	sec	- rad
ft	- m	oz(Troy)	- kg	min	- rad
miles	- km	lb	- kg	deg	- rad
fathom	- m	grain	- kg	<u>VELOCITY</u>	
parsec	- m	<u>FORCE</u>		in/s	- m/s
AU	- m	oz	- N	ft/s	- m/s
light year	- m	lb	- N	km/h	- m/s
				mile/h	- m/s
<u>AREA</u>		<u>PRESSURE</u>		<u>ENERGY</u>	
inch ²	- cm ²	psi	- N/cm ²	BTU	- Joule
ft ²	- m ²	atm	- N/cm ²	CAL	- Joule
yard ²	- m ²	in-mercury	- N/cm ²	<u>POWER</u>	
acre	- m ²	Torr	- N/cm ²	BTU/s	- kW
<u>VOLUME</u>		<u>DENSITY</u>		BTU/min	- W
in ³	- cm ³	lb/in ³	- kg/m ³	ft-lb/s	- W
ft ³	- m ³	lb/ft ³	- kg/m ³	HP	- kW
yd ³	- m ³				
gal	- m ³				

4. Computerized conversion table inch to millimeters, range: 0 to 1.1799 inches in increments of 0.0001 inch, accurate to 0.0001 inch.
5. Pound to kilogram conversion (one-way only) accurate to one gram (g).
 - a. 0- 20 lbs, in increments of 0.1 lb.
 - b. 0-500 lbs, in increments of 1 lb.
 - c. 0-2000 lbs, in increments of 2 lbs.
6. Conversion Charts for Temperature:
 - a. °C to °F
 - b. °C to °F change
 - c. Kelvin (K) to Rankin (R)
7. Computer Conversion Service (MSFC only). For details call

Mr. W. F. Crumbley

NASA

George C. Marshall Space Flight Center

Marshall Space Flight Center, AL 35812

S&E-COMP-RDC

Tel.: (205) 453-5941.

L. ADDRESSES FOR INFORMATION

1. American National Standards Institute
1430 Broadway, New York, NY 10018
2. American Society for Testing and Materials
1916 Race Street, Philadelphia, PA 19103
Tel: (215) 569-4200
3. British Book Center, Inc.
996 Lexington Ave. New York, NY
Tel: (212) 879-6577
4. British Metrication Board
Chairman: Lord Ritchie-Calder
22 Kingsway, London WC2, England
5. British Standards Institution
2 Park Street, London W1Y 4AA, England
6. Canadian Metric Association, The -,
President: Prof. Guy W. Richard,
P. O. Box 35, Fonthill, Ontario, Canada
7. Canadian Standards Association
178 Rexdale Boulevard, Rexdale, Ontario, Canada
8. Center for Metric Education
Directors: Dr. John J. Feirer, Dr. John R. Lindbeck
Western Michigan University,
Kalamazoo, MI
Tel: (616) 383-4600
9. Central Film Library
Government Building
Bromyard Avenue
London W3, England
10. Construction Industry Training Board (CITB)
Radnor House, London Road, Norbury SW16,
London, England
11. Dr. Daniel V. DeSimone
Office of Science & Technology
Executive Office of the President
The White House, Washington DC 20506
11. ISO/TC20, Aircraft and Space Vehicle
US Representative, Mr. L. Leroy Stoner
Manager, Technical Division
Society of Automotive Engineers, Inc.
2 Pennsylvania Plaza, New York, NY 10001
Tel: (212) 594-5700
12. Metric Association, Inc.
President: Louis F. Sokol
Sugarloaf Road, Salina Star Route
Boulder, CO 80302
Tel: (303) 442-5342
Secretary: Dr. Richard W. Mattoon
Chemical Physics, Dept. 482
Abbott Laboratories
North Chicago, IL 60064
Tel: (312) 688-7178

Treasurer: Fred J. Helgren
2004 Ash Street
Waukegan, IL 60085
Tel: (312) 623-2212

13. Metrication Board of Zambia, The -,
P. O. Box 1968
Lusaka, Zambia
14. National Bureau of Standards
Washington, DC 20234
Dr. Louis E. Barrow, Consultant and Coordinator Metric Activities
Tel: (301) 921-2658
Mr. Jeffrey V. Odom, Metric Study Program
Tel: (301) 921-3651
Mr. W. R. Tilley, Chief, Office of Technical Information and Publications
Tel: (301) 921-2493
15. Normenstelle Luftfahrt, NL
7022 Leinfelden
Dreimorgenstr. 8
West Germany
16. Overseas Film Library
Central Office of Information
Hercules Road, Westminster Bridge Road
London SE1, England
17. Rovipress Ltd.,
Metric Information Service
8-10 Parkway
London NW1, England
18. South African Bureau of Standards
Private Bag 191
Pretoria, South Africa
19. Standards Association of Australia
80-86 Arthur Street
North Sydney, Australia
20. Superintendent of Documents,
US Government Printing Office
Washington DC 20402
21. University of Southern Mississippi
Department of Science Education
Project for Metric Research
Southern Station, Box 403
Prof. John M. Flowers, Director
Hattiesburg, MS 39401
Tel: (601) 260-7213 or 7148

M. SOURCES OF METRIC TOOLS, INSTRUMENTS, COMPONENTS, ETC.

The following is a preliminary, representative list of manufacturers producing metric items or rendering metric services. This list does not represent endorsement of these manufacturers or products; it is given for information only:

- | | | |
|--|-------------------|---|
| 1. Acme Shear Co., The -
100 Hicks Street
Bridgeport, CT 06609 | (203)
384-1371 | Westcott rulers: combination inch-metric rules in 15, 30, 38, 50 and 100 cm sizes |
| 2. Adams Tool & Supply Co.
1630 W. Armitage Ave.
Chicago, IL 60622 | (312)
278-2070 | Measuring instruments; Conversion tables, drills, taps, dies, fasteners, gages |
| 3. American National Standards Institute, Inc. 1430 Broadway
New York, NY 10018 | (212)
668-1220 | Engineering Standards, incl. ISO and IEC International Standards |
| 4. American Society for Testing and Materials, Inc. 1916 Race Street, Philadelphia, PA 19103 | (215)
569-4200 | Conversion slide rules: U. S. Customary to SI units |
| 5. Atlantic Industrial Corp.
555 Lehigh Ave.
Union, NJ 07003 | (201)
687-5900 | Measuring tape in metric units (2 m length) |
| 6. Bellmore Precision Components Co., 1275 Newbridge Rd.
Bellmore, NY 11710 | (516)
785-4628 | Metric precision machined products |
| 7. Beloit Tool Corp.
P. O. Box 38
South Beloit, IL 61060 | (815)
398-3461 | Taps, dies, drills, thread gages, reamers, fasteners, educational material (books, films) |
| 8. Bevco
P. O. Box 5023
Glendale, CA 91201 | (213)
849-1474 | Metric tools, wrenches, measuring instruments |
| 9. Bishop Graphics, Inc.
7300 Radford Ave.
North Hollywood, CA 91605 | (213)
982-2000 | Printed wiring art work |
| 10. Borkin Co., R. A.
7465 Monawk Road
Milwaukee, WI 53217 | | Metric reamers |
| 11. British Alum
Norfolk House, Norfolk Square
London, England | | Aluminum products to metric and ISO engineering standards |
| 12. Brooks, T. J., Ltd.,
Barkby Road, Leicester LE4 7HX
England | | ISO Metric fasteners for aerospace according to LW Standards |
| 13. Brown & Sharp Mfg. Co.
Precision Park
North Kingstown, RI 02852 | | Metric tools |
| 14. Bucher & Mayer GmbH
Stuttgart-Bad Cannstadt
Reichenbachstrasse 24
West Germany | | Metric hand tools "Gedore" |
| 15. C.E.M. Co., Inc.
24 School Street
Danielson, CT 06259 | (203)
774-8571 | Spring pins in metric sizes |

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| 16. C-Thru Ruler Co.
5 Britton Drive
Bloomfield, CT 06002 | (203)
243-0303 | English-metric slide rule conversion |
| 17. Cambridge Thermionic Corp.
445 Concord Ave.
Cambridge, MA 02138 | (617)
491-5400 | Terminals, terminal boards, coils,
chokes, coil forms, connectors
(Metric Catalog M 747) |
| 18. Cap Screw & Nut Co.
197 Fabyan Place
Newark, NJ 07112 | (201)
374-4300 | Metric bolts, nuts and washers |
| 19. Chicago-Latrobe Division
411 W. Ontario Street
Chicago, IL 60610 | (312)
337-6727 | Drills, reamers, (drill chart) |
| 20. Commonwealth Tools & Special-
ties Corp.
89 Greene Street
New York, NY 10012 | (212)
966-2151 | Taps, drills, reamers, fasteners |
| 21. Cooper Thermometer Co., The -
Reed's Gap Road
Middlefield, CT 06455 | (203)
349-3473 | Celsius scale thermometers |
| 22. Daystrom, Inc.
Western Instruments & Electro-
nics Division
736 S. Monterey Pass Road
Monterey Park, CA 91754 | (213)
268-9271 | Celsius scale thermometers |
| 23. Deltronics Corp.
929 Baker Street
Costa Mesa, CA 92626 | (714)
545-0401 | Precision gages (Millimeter-inch
equivalent reference charts) |
| 24. Dexter & Co. (High Wycombe) Ltd.
Queens Road, High Wycombe,
Buckinghamshire, England | | Machine tool conversion dials
"High Speed Dexter Twin Dial" |
| 25. Dice Company, J. W.
16 Highwood Avenue
Englewood, NJ 07631 | (201)
569-0471 | Electronic micrometers readable to
0.002, 0.001 and 0.0002 mm |
| 26. Dietzgen
2425 N. Sheffield Ave.
Chicago, IL 60614 | (312)
549-3300 | Metric drawing equipment and supplies |
| 27. du Mont Corp., The -
40 Riddle Street
Greenfield, ME 01301 | (413)
773-3674 | Metric keyway broaches, cutters,
tool bits |
| 28. Durakut International Corp.
22-T Central Drive
Farmingdale, NY 11735 | (516)
293-4920 | Metric dies |
| 29. Durr Surgical Supply Co.
10005 Memorial Parkway S.
Huntsville, AL | (205)
381-7540 | Metric measuring cups, kg- scales |
| 30. Dzus Fastener Co., Inc.
425 Union Blva.
W. Islip, NY 11795 | (516)
669-0494 | Metric fasteners |

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| 31. Echo, Inc.
822-024 East Main Street
Springfield, OH 45503 | (513)
322-4973 | Celsius scale thermometers,
wall type |
| 32. Edmund Scientific Co.
Edscorp Bldg.
Barrington, NJ 08007 | (609)
547-3488 | Tools, measuring instruments,
tap & die sets, drills, scales |
| 33. Educational Supply Co.
105 Brisbane Road
Downsview, Ontario, Canada | | Metric teaching aids
"Osmiroid Centicubes" |
| 34. Elastic Stop Nut Division
Amerace ESNA Corp.
Union, NJ | (201)
686-6000 | Metric and ISO fasteners |
| 35. Engris Equipment Co.
3035 Austin Ave.
Morton Grove, IL 60053 | (312)
966-5600 | BSI metal conversion slide rule |
| 36. Fairbank Morse
711 E. Street
St. Johnsbury, VT 05819 | (802)
748-2371 | Weighing systems, scales |
| 37. Fairgate Rule Co., Inc.
Cold Spring, NY 10516 | (914)
265-3677 | Aluminum rules in 60, 100 and
200 cm (one piece) |
| 38. Fisher & Crome
2427 N. Moscher Street
Philadelphia, PA 19133 | (215)
426-3232 | Metric templates |
| 39. Fisher Scientific Co.
203 Fisher Bldg.
Pittsburgh, PA 15219 | (412)
391-1330 | Laboratory equipment with metric
units |
| 40. Fisher Special Mfg. Co.
447 Morgan St.
Cincinnati, OH 45206 | (513)
916-1280 | Metric nuts |
| 41. Drs. Uri Gat, P.E. and
O.J. Hahn
318 Sheridan Drive
Lexington, KY 40503 | (606)
277-6017
272-2926 | Metric consultants |
| 42. General Hardware Mfg. Co.
80 White Street
New York, NY 10013 | (212)
227-2647 | Metric steel rules, vernier and
micrometer calipers, hand tools |
| 43. GKN International
1133 Ave. of the Americas
New York, NY 10036 | (212)
765-2020 | Fasteners |
| 44. Graham, John H. & Co., Inc.
14 Thomas Street
New York, NY 10007 | (212)
962-2250 | 8-ender metric socket wrench tool
(8 different sockets) |
| 45. Hamilton Scale Corp.
3350 Secor Road
Toledo, OH 43606 | (419)
474-2151 | Weighing systems, scales |
| 46. Hanson Scale Co.
1775 Shermer St.
Northbrook, IL 60062 | (312)
272-1100 | Utility scales in grams and kg. |

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| 47. Hardware & Industrial Products (412)
Div, H.A. Porter Co.
300 Porter Bldg.
Pittsburgh, PA 15219 | 391-1800 | Disston 2 and 2.5 m flexible steel
tape rules |
| 48. Hartley Gove Sons
P. O. Box 909-T
Brookhaven, Miss. 39601 | (601)
833-2911 | Celsius scale thermometers |
| 49. Hi-Shear Corp.
Sky Park Drive
Torrance, CA 90509 | (213)
326-8110 | Metric fasteners |
| 50. HJS Engineering Co.
5215 N. Marmora Ave.
Chicago, IL 60630 | . | Metric machines, tools, and measuring
equipment. Conversion service from
inch to metric |
| 51. Hobart Mfg. Co., The -
P. O. Box 11989-T
Columbia, SC 29211 | (803)
754-8800 | Weighing systems, kg scales |
| 52. Howe Richardson Scale Co.
680 Van Houten Ave.
Clifton, NJ 07015 | | Weighing systems, kg scales |
| 53. Hubbel, Inc., Harvey -
Bridgeport, CT 06602 | | Metric fasteners |
| 54. INA Bearing Co., Inc.,
INA Drive
Cheraw, SC 29520 | (803)
537-2106 | Metric bearings |
| 55. Ideal Aerosmith, Inc.
Box 269-T
Cheyenne, WY 82001 | (307)
634-7714 | Machine tool conversion
"Koder II" |
| 56. Imperial Fastman Corp.
6300 W. Howard Street
Chicago, IL 60648 | (312)
774-1700 | Metric size tools for tube bending
and flaring |
| 57. Information General Corp.
Woodland Hills, CA | | Metric converters |
| 58. Innovative Management Systems (312)
President: Joseph L. Pokorney
P. O. Box 367
Northbrook, IL 60062 | 272-3170 | Metric consulting services |
| 59. International Wire Machinery
Corp., 16 W. 46th Street
New York, NY 10036 | (212)
756-1860 | Metric bearings |
| 60. Isaac Co., The -
595 E. Gailbrath Rd.
Cincinnati, OH 45215 | (513)
761-8855 | Pressure gages |
| 61. Kelm Manufacturing Co.
Route No. 2
Coloma, MI 49022 | (616)
925-6372 | Metric-English conversion kits
(calculator and graphic charts) |
| 62. Keuffel & Esser Co.
303 Adams Street
Hoboken, NJ 07030 | (201)
659-1100 | Drawing instruments, graph paper,
scales for drafting machines |

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| 63. Kirby Advertising Specialties
823 Chamber Drive NE
Huntsville, AL | (205)
539-2001 | Plastic pocket cards with metric
conversion figures |
| 64. Klimo und Bongartz
2000 Hamburg 70
Tratzingerstr. 21
West Germany | | International traffic signs |
| 65. Kromhard Twist Drill Co.
1095 Sweitzer St.
Akron, OH 44301 | (216)
535-7129 | Metric drill, taps, dies |
| 66. Laboratory Supplies Co., Inc.
29 Jeffry Lane
Richsville, NY 11801 | (516)
681-7711 | Metric laboratory supplies |
| 67. Lion Tool & Gage Co.
24039 Dequindre Road
Hazel Park, MI 48030 | (313)
545-2888 | Metric dies |
| 68. Mac Tools, Inc.
197 Jefferson Street
Sagina, OH 45169 | (513)
584-2411 | Metric tools, taps and dies |
| 69. Metra-Tech Corp.
P. O. Box 699
Easton, MD 21601 | (301)
822-3486 | Attachment to machine tools to
provide simultaneous inch-metric
read-out with certified accuracy |
| 70. Metric-Aids
75 Horner Ave
Toronto M30, Ontario, Canada | | Metric teaching aids |
| 71. Metric Association, Inc.
Sugarloaf Road
Salina Star Route
Boulder, CO 80302 | (303)
442-3342 | Metric promotion material: rules,
meter sticks, measuring tapes,
Celsius thermometers, GO METRIC
bumper stickers and lapel pins |
| 72. Metric & Multistandard Com-
ponents Corp.
193-200 Saw Mill River Road
Elmsford, NY 10523 | (914)
592-4020 | Metric fasteners, calipers, micro-
meters, hand tools, taps, dies |
| 73. Metric Div., US Socket Screw
Corp., 126-T Lafayette
New York, NY 10013 | (212)
925-5645 | Metric fasteners, nuts, taps;
wrenches, tools |
| 74. Micro Metrics, Inc.
253 Crooks Ave.
Clifton, NJ 07011 | (201)
478-8440 | Metric gears |
| 75. Milbern Co.
P. O. Box 51
New York, NY 10009 | | Circular metric charts with
machinists drilling, tapping and
clearance data |
| 76. Millimeter Industrial Supply
Corp., 162 Central Ave.
Farmingdale, NY 11735 | (212)
937-1154 | Metric fasteners, calipers, fee-
ler gages, drills, wrenches,
taps, dies, cutters |
| 77. Mills Resistor Co.
10810 Kaylor Street
Los Alamitos, CA 90720 | (213)
598-2454 | Precision wirewound resistors
featuring metric measurements |

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| 78. Montgomery Ward
Retail Stores | | Automotive wrenches, socket, box and open end |
| 79. Nadash, André
Box 356
Riverdale, MD 20840 | | Metric consultant |
| 80. National Camera, Inc.
Englewood, CO 80110 | | Hand tools, micrometers, calipers, drills |
| 81. National Microfilm Association
8728 Colesville Road
Silver Spring, MD 20910 | | "Think Metric" posters |
| 82. New Era Conversion Co.
District Bank Chambers
Market Place
Hinckley, Leics., England | | Machine tool conversion dials, "Unidial" |
| 83. Ohaus Scale Corporation
35 Hanover Road
Florham Park, NJ 07932 | (201)
377-9000 | Laboratory balances and weights, elementary measurement kit for classroom use with balance, weights, rulers, calipers and booklets |
| 84. Omaro
13 Rue de la Nation
Paris 18, France | | Conversion slide rule ("C.8"). French-British-American "Gabarit" |
| 85. Pelouze Manufacturing Co
1208 Chicago Ave.
Evanston, IL 60202 | (312)
328-8330 | Weighing systems, scales |
| 86. Penn, E. Joe
4910 Carson Ave.
Indianapolis, IN 46227 | (317)
786-8070 | Inch-mm conversion booklet, wall charts |
| 87. Pic Design Corp.
Box 335
Ridgefield, CT 06877 | (203)
438-0345 | Metric racks and pinions |
| 88. Polymetric Services
President: R. A. Hopkins
4600 Brewster Drive
Tarzana, CA 91356 | (213)
801-2227 | Metric consultants; educational and visual training aids, calculators and measuring devices |
| 89. Production Tool Supply Co.
11311 E. Eight Mile Road
Warren (Detroit), MI 48090 | (313)
755-2200 | Tools and metric supplies |
| 90. Rapid Design, Inc.
2601 N. San Fernando
Burbank, CA 91504 | (213)
849-5007 | Drawing templates |
| 91. Reyher-Schrauben
2 Hamburg 50
Haferweg 3a
West Germany | | German standards bolts, nuts, washers and related hardware |
| 93. Ridge Tool Co., The -
400 Clark Street
Elyria, OH 44035 | (216)
323-5581 | Metric fasteners, pipes |
| 94. Roechling Steel, Inc.
60 East 42nd Street
New York, NY 10017 | | Finished steel products in ISO and metric standards |

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| 95. Ronningën Metric Co.
6102 Palo Cristi
Paradise Valley, AL 35253 | | Conversion tools
U.S.-Metric weights and measures |
| 96. Rosan, Inc.
2901 West Coast Hwy.
Newport Beach, CA 92663 | (714)
543-5533 | Metric fasteners |
| 97. Sama & Etani, Inc.
Groton, Mass. 01456 | | Reference tables and circular
slide rules "Model 600" |
| 98. Sargent-Welch Scientific Co.,
The -, 7300 N. Linder Ave.
Skokie, IL 60078 | | Aids for teaching the metric
system: wall charts, measuring
sets, decimeter cubes |
| 99. Science Associates, Inc.
230 E. Nassau St.
Princeton, NJ 08540 | (609)
924-4470 | Weather instruments with
metric graduations, thermometers,
barometers, rain gages |
| 100. Scott Graphics Corp., Inc.
195 Appleton St.
Holyoke, Mass. 01040 | | Metric measurements for micro-
copying equipment, films and
accessories |
| 101. Sears, Roebuck
Retail Stores | | Automotive wrenches: socket,
box, and open end |
| 102. Shardlow Micrometers, Ltd.
Box 62, Petre Street
Sheffield 4, Yorkshire, England | | Micrometers with dual US/Metric
readings |
| 103. Siber Precision, Inc.
450 Barell Ave.
Carlstadt, NJ 07072 | (201)
939-8510 | Metric vernier calipers |
| 104. Snap-On Tools Corp.
8049 28th Ave.
Kenosha, WI 53140 | (414)
654-8681 | Metric wrenches, socket, box,
and open end |
| 105. Standard Pressed Steel Co.
Jenkintown, PA 19046 | (215)
804-7300 | Socket head cap screws, socket
set screws, socket head hex keys
also for aerospace application |
| 106. Standard Tool Co.
1630 N. Armitage Ave.
Chicago, IL 60622 | (312)
278-2070 | Measuring instruments, conversion
tables |
| 107. Starrett, L. E., The -
101 Crescent Street
Athol, MA 01331 | (617)
249-3551 | Measuring instruments |
| 108. Staveley Machine Tools, Inc.,
34 Tower Street
Hudson, MA 01749 | (617)
562-3444 | Machine tool conversion dials |
| 109. Sunset House
Beverly Hills, CA 90213 | | Label: "METRIC DESIGN - Use Proper
Tools and Spare Parts" |
| 110. Swani Publishing Co.
Box 248
Roscoe, IL 61073 | | Label: "USA Goes Metric"
books: Introduction to Metric
Units, ISO Metric Fastener Data |
| 111. TAD Products Corp.
P. O. Box 25
Beverly, MA 01915 | (617)
927-3555 | English-Metric converters |

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|---|-------------------|---|
| 112. Tanner Enterprises
2011 Jordan Lane SW
Huntsville, AL 35805 | (205)
539-4009 | ISO format and metric sizes stationery; Celsius fever thermometers, Celsius outdoor thermometers, chassis punches |
| 113. Taylor Instrument Companies
Arden, NC 28704 | (704)
648-8111 | Thermometers, barometers, barographs, rain gages with metric scales |
| 114. Testometric Co., The -
100 A Market Street
Hyde SK14 1ES, England | | Conversion components and service for instruments and machines to metric units; replacement dials and scales |
| 115. Timken Roller Bearing Co., The -
Canton, OH 44706 | (216)
453-4511 | Metric and ISO ball bearings |
| 116. Torrington Co., The -
59 Field Street
Torrington, CT 06790 | (203)
482-4441 | Metric and ISO roller bearings |
| 117. Torsion Balance Co.
35 Mchegan Street
Clifton, NJ 07013 | (201)
473-6900 | Precision weighing equipment, including weights, in the metric system |
| 118. Unz & Co.
24 Beaver
New York, NY 10004 | (212)
944-2075 | Conversion tables |
| 119. Van Keuren Co., The -
176 Waltham Street
Watertown, MA 02172 | (617)
926-1450 | Metric standards |
| 120. Veteran Tool & Supply co.
3 A Howard Street
New York, NY 10013 | (212)
925-0940 | Metric nuts, screws, calipers, micrometers, hand tools, reamers, taps, dies, wrenches |
| 121. Vickers Ltd.
Crayford Works
Crayford, Kent, England | | Machine tool conversion dials and units |
| 122. Weksler Instruments Corp.
195 E. Merric Road
Freeport, Long Island, NY 11520 | | Thermometers, indicating, recording and controlling instruments with Celsius scales |
| 123. Williams, J. H. & Co.
420 Vulcan Street
Buffalo, NY 14207 | (716)
876-3200 | Tools |
| 124. Wilson, Mr. Lloyd B. -
145 Tanners Pond Road
Garden City, NY 11530 | | Metric conversion consultant |
| 125. Xcelite, Inc.
Orchard Park
New York, NY 14127 | (716)
662-4461 | Metric hand tools |
| 126. Zelenda Machine & Tools Corp.
66-02 Austin Street
Forest Hills, NY 11374 | (212)
896-2288 | Metric nuts, bolts, fasteners, calipers, feeler gages, drills, wrenches, reamers, taps, dies. |